REMARKS

The Office Action of May 13, 2008, has been carefully considered and reconsideration of the application in view of the present submission is respectfully requested.

Obviousness Rejections 35 U.S.C. §103

In the aforesaid Office Action, all the claims were rejected under 35 U.S.C. §103(a) as allegedly being obvious and unpatentable over the disclosure of Osumi et al (US6375317) in view of Katsuragi et al (EP1125994) , or in view of this combination of references further in view of one or more of Yue et al. (US 6461418), Suzuki et al. (US 6153001), and Katsuragi et al. (EP 1191077). Applicants respectfully traverse this final rejection.

Obviousness Rejection 1

Claims 1, 4-8, 10, and 16-19 stand rejected as allegedly being obvious over the disclosure of Osumi et al (US6375317) in view of Katsuragi et al (EP1125994). Osumi et al (US6375317), as the closest prior art, as suggested by the Examiner, can only be considered as teaching within its broad disclosure an ink set comprising a first ink, comprising a self-dispersing pigment (SDP), and a calcium salt in the first ink. The secondary reference is Katsuragi et al (EP1125994) can only be considered as teaching within its broad disclosure an ink set comprising a first ink, comprising a self-dispersing pigment (SDP), and a fixing fluid, comprising a polyvalent metal salt. The polyvalent metals for the fixing fluid specifically named therein are magnesium, calcium, barium, iron, copper and zinc. Of these, calcium and magnesium are listed as most preferred [0049] and are the only polyvalent metal fixers exemplified.

In fact, the results in Applicants' specification are consistent with this expectation of equivalence of polyvalent metal as fixers for an SDP ink when no soluble polymer binder or multivalent (calcium) cation is present. As detailed in Applicants' previous response, and incorporated here by reference, fixation of SDP ink (when no polymer or multivalent cation is present) with copper fixer gives substantially similar OD results compared to calcium and other multivalent metal fixers. See Table after paragraph [0122] where example ink A which has SDP but not polymeric binder or calcium has nearly equivalent OD results with fixers containing calcium, zinc, polyethyleneimine, and copper. Furthermore, when polymeric binder is added to the SDP (inks B and C) the OD is reduced versus the ink A, this being

consistent with the expectation that SDP ink with polymeric binder in the ink will have reduced OD even in the presence of fixing agents such as calcium, zinc, polyethyleneimine. The inventive combination of SDP with polymeric binder AND a copper fixer does surprisingly improve OD. See Table after paragraph [0122], Fixer D1 with Ink B and Ink C and comparison with Ink A.

What was discovered by Applicants is that the multivalent metals are not equivalent as fixers for an ink comprising SDP when that ink further comprises a soluble polymer binder or/and an effective amount of calcium cation. Fixers with copper gave surprising, unpredictable, and unexpectedly superior OD results compared to fixers with calcium and other metals when used with a first ink comprising SDP and a soluble polymer binder or/and an effective amount of calcium cation. These unexpected results, which are demonstrated in Applicants' specification, describe the superior performance of the copper fixer in combination with an SDP ink containing soluble polymer binder and/or calcium cation. Applicant's invention is of significant magnitude, and practical importance, for it results in a visually perceptible increase in OD and consequently better image quality.

In Example 3 of the specification (See Table after paragraph [0127]), Ink B (self-dispersing pigment with soluble polymer binder) paired with the copper-containing fixer D1 achieved significantly and surprisingly superior optical density at a lower area fill of the fixing fluid than the same ink paired with other fixers including calcium-containing fixer F1. The ability to use lower area fill of fixing fluid is advantageous because it imposes less liquid load on the substrate. At fixer fills greater than 75%, paper curl was severe.

In Example 6 of the specification (See Table after paragraph [0134]), inks L2-L4 (self-dispersing pigment with multivalent metal salt) paired with the copper fixer D1 gave better optical density than similar ink (Ink L1, no salt) paired with D1. Especially advantageous is the pairing of Ink L2 (with added calcium salt) and copper fixer D1 which gave significantly and surprisingly superior optical density than the same ink fixed with calcium fixer A1. Similarly, an ink comprising self-dispersing pigment and both soluble binder and calcium salt (Ink M) paired with copper fixer D1 gave significantly and surprisingly superior optical density than the same ink fixed with calcium fixer A1.

Since all of the claims require that a copper containing fixer fluid be used with the first ink to comprise soluble polymer binder or/and multivalent, namely calcium

cation, they are clearly commensurate in scope with the unexpected results shown in the specification.

Based on these arguments Obviousness Rejection 1 should be overcome.

Obviousness Rejection 2

Claims 2, 3, 14, and 15 stand rejected as allegedly being obvious over the disclosure of Osumi et al (US6375317) and Katsuragi et al (EP1125994) further in view of Yue et al. (US 6461418), These rejected claims are dependent claims which describe the presence of soluble polymeric binder.

As discussed above, Osumi and Katsuragi do not provide the motivation to combine the ink and fixer combination described in this application. In fact the possible combination of Osumi and Katusuragi leads to an inferior results as provided by the comparative examples in the current application. While Yue provides the addition of acrylic binders to an ink; there is no motivation or suggestion to combine these inks with acrylic binders with a fixer fluid, especially the copper fixer fluid of the invention.

The combination of Osumi, Katsuragi and Yue does not motivate or suggest to one skilled in the art that combining the elements of Applicant's invention would result in the unexpected results of the inventive ink (i.e. OD of the ink)..

Obviousness Rejection 3.

Claims 9, and 20 stand rejected as allegedly being obvious over the disclosure of Osumi et al (US6375317) and Katsuragi et al (EP1125994) further in view of Suzuki et al. (US 6153001), These rejected claims are dependent claims which describe the presence of anionic moieties on the carbon black pigment.

As discussed previously, Osumi and Katsuragi do not provide the motivation to combine the ink and fixer combination described in this application, in fact the possible combination of Osumi and Katusuragi lead to an inferior results as provided by the comparative examples in the current application. While Suzuki provides the presence of the anionic moieties on the carbon black pigment, Suzuki does not provide using the ink jet ink which has SDP with anionic moieties and the soluble polymeric binder and/or the calcium cation in an effective amount in combination with the copper containing fixer fluid.

The combination of these references does not motivate or suggest the combination described in the invention and especially the unexpected results describe above.

Obviousness Rejection 4

Claims 11-13 stand rejected as allegedly being obvious over the disclosure of Osumi et al (US6375317) and Katsuragi et al (EP1125994) further in view of Katsuragi et al (EP1191077). These rejected claims describe the jetting of the copper containing fixer fluid prior to the jetting of the first ink (the SDP ink with soluble polymeric binder and/or the calcium cation in aneffective amount.

As discussed previously, Osumi and Katsuragi do not provide the motivation to combine the ink and fixer combination described in this application, in fact the possible combination of Osumi and Katusuragi lead to an inferior results as provided by the comparative examples in the current application. While Katsuragi, '077 does describe the printing order and area fill of the fixer fluid and the ink, it does supply the additional motivation using the ink jet ink which has SDP with the soluble polymeric binder and/or the calcium cation in an effective amount in combination with the copper containing fixer fluid and further printing the fixer fluid prior to printing the SDP ink and printing the fixer fluid in an area less than the SDP ink and optionally less than a 60 % area fill.

Applicants have attempted to point out to the Examiner comparative data in the specification that associates the distinguishing feature of the invention over the cited prior art documents causes an unexpected result. Applicant kindly request the Examiner to further review the comparative data in the specification. Applicants respectfully request reconsideration herein.

As previously stated, the technical problem addressed in the application is to provide both high optical density (OD) and good rub-fastness in an ink set comprising at least one aqueous ink containing a self-dispersed pigment (SDP) colorant, a soluble polymer binder or/and an effective amount of calcium cation.and an aqueous fixer fluid comprising a soluble copper salt. As stated in the specification at paragraphs [0010], one of ordinary skill in the art at the time of the invention would have generally expected the addition of polymer binder to improve rub-fastness but decrease OD, presumably because it helps shield the pigment from the OD enhancing effect of the fixer. The present inventors, however, have found that from among the infinite number of possible combinations, only a certain cationic

{copper(II)} salt fixer/SDP ink combination with soluble polymer binder and/or a calcium cation present does not experience this negative effect on OD.

It is well established that evidence of unobvious or unexpected advantageous properties, such as superiority in a property the claimed compound shares with the prior art, can rebut *prima facie* obviousness. [MPEP § 716.01(a) and § 716.02(a)]. Such evidence of unexpected results (compared to the prior art) was presented.

Since all of the claims require the use of a copper fixer fluid and the first SDP ink to comprise soluble polymer binder or/and multivalent, namely calcium cation, they are clearly commensurate in scope with the unexpected results shown in the specification.

In summary, although the Applicants maintain that the cited references do not set forth even a *prima facie* case for obviousness, as argued in Applicant's previous response, it is, nevertheless, respectfully submitted that the evidence of unexpectedly superior results is compelling and sufficient to rebut any *prima facie* case of alleged obviousness. In the face of such evidence, all rejections made under 35 U.S.C. §103(a), should be withdrawn.

Conclusion

In view of the above remarks, all rejections are believed to have been successfully traversed and the pending case is otherwise believed to be in condition for allowance. If the Examiner should believe that anything further may be required to place this application in even better form for allowance, he is cordially invited to telephone the undersigned attorney for Applicant.

Respectfully submitted,

Respectfully submitted,

Gregory J. Feulner

GREGORY J. FEULNER
ATTORNEY FOR APPLICANTS
REGISTRATION NO. 41,744
TELEPHONE: 302-992-5285

FACSIMILE: 302-992-2533

Dated: 11.12.08